What is Claimed Is:

1. A semiconductor package, comprising:

a semiconductor chip having a plurality of first thermal fins on a non-active surface of the semiconductor chip, wherein the first thermal fins longitudinally extend across the non-active surface of the semiconductor;

a heat conducting device having a plurality of second thermal fins on a mating surface of the heat conducting device, wherein the second thermal fins longitudinally extend across the mating surface of the heat conducting device; and

a thermal joint formed between the non-active surface of the semiconductor chip and the mating surface of the heat conducting device, the thermal joint comprising a plurality of interdigitated thermal fins separated by a compliant thermally conductive material, wherein the interdigitated thermal fins comprise the first and second thermal fins, and wherein a gap size between the interdigitated thermal fins of the thermal joint varies across the thermal joint.

2. The semiconductor package of claim 1, wherein thermal joint comprises a plurality of bands of interdigitated thermal fins, wherein the gap size between the interdigitated thermal fins of the thermal joint is varied across the thermal joint by maintaining a fixed gap

size between interdigitated thermal fins in each band, while providing a different fixed gap size between interdigitated thermal fins in different bands.

3. The semiconductor package of claim 2, wherein the gap size between interdigitated thermal fins is varied in each of the bands by maintaining the interdigitated thermal fins in all bands at same fixed width, while providing a different pitch between the first thermal fins and corresponding second thermal fins forming the interdigitated thermal fins in different bands.

4. The semiconductor package of claim 2, wherein the gap size between interdigitated thermal fins is varied in each of the bands by maintaining a fixed pitch between the first thermal fins and between the corresponding second thermal fins forming the interdigitated thermal fins in all the bands, while providing a different width of the interdigitated thermal fins in different bands.

5. The semiconductor package of claim 2, wherein the thermal joint comprises a first band of interdigitated thermal fins that provides a thermal conductivity between the semiconductor chip and heat conducting device which is greater than that thermal conductivity provided by other

bands of interdigitated thermal fins, and wherein the first band is orientated to extend in a direction that passes through a neutral stress point of the semiconductor package.

6. The semiconductor package of claim 5, wherein the interdigitated thermal fins in the first band are separated by a first gap size, G1, which is smaller than all other gap sizes between interdigitated thermal fins in the other bands of interdigitated thermal fins.

7. The semiconductor package of clam 5, wherein the first band of interdigitated thermal fins is orientated to extend in a direction that passes through a hot spot area of the semiconductor chip and the neutral stress point of the semiconductor package.

8. The semiconductor package of claim 1, wherein a TCE (thermal coefficient of expansion) of a material forming the heat conducting device is about 3 times or greater than a TCE of a material forming the semiconductor chip.

9. The semiconductor package of claim 1, wherein the semiconductor chip is formed of silicon, and wherein the heat conducting device is formed of copper.

10. The semiconductor package of claim 1, wherein the heat conducting device is a package lid, a package cap, a heat sink, a cooling plate, or a thermal hat.

11. The semiconductor package of claim 1, wherein the compliant thermally conductive material comprises a thermal paste and has a thickness of about 25 microns or greater.

12. The semiconductor package of claim 1, wherein the compliant thermally conductive material comprises a thermal fluid and has a thickness of about 5 microns or greater.

13. The semiconductor package of claim 1, wherein a height of the first and second thermal fins is about 500 microns or less.

14. The semiconductor package of claim 1, wherein a height of the first and second thermal fins is less than or equal to about 300 microns.

15. The semiconductor package of claim 3, wherein the fin width is less than or equal to about 250 microns.

16. The semiconductor package of claim 3, wherein the fin width is less than or equal to about 150 microns.

17. The semiconductor package of claim 4, wherein the pitch between the first thermal fins, and the pitch between the second thermal fins, is less than or equal to about 500 microns.

18. The semiconductor package of claim 4, wherein the pitch between the first thermal fins, and the pitch between the second thermal fins, is less than or equal to about 350 microns.

19. The semiconductor package of claim 1, wherein gaps are formed in one or more of the first thermal fins, the second thermal fins, or both, to enable flow of the compliant thermally conductive material in the thermal joint due to movement of the interdigitated thermal films caused by expansion and contraction of the semiconductor chip and heat conducting device.

20. The semiconductor package of claim 19, wherein a density of gaps formed in the one or more first and/or second thermal fins increases toward edge regions of the semiconductor chip.

21. The semiconductor package of claim 1, wherein the thermal joint comprises air spaces above the first or second thermal microfins to provide vertical mechanical compliance.

22. A MCM (multiple chip module) package, comprising:

a package substrate;

a plurality of semiconductor chips mounted face down on the substrate; and

a heat conducting device that is thermally coupled to a non-active surface of each of the plurality of semiconductor chip using a thermal joint connection between at least one of the semiconductor chips and the heat conducting device,

wherein each thermal joint comprises a plurality of longitudinally extending interdigitated thermal fins separated by a compliant thermally conductive material,

wherein the longitudinally extending interdigitated thermal fins of each thermal joint formed between the semiconductor chips and heat conducting device are orientated to extend in a direction that passes through a neutral stress point of the semiconductor package.

23. The MCM package of claim 22, wherein the interdigitated thermal fins of each thermal joint comprises a plurality of first thermal fins formed on the non-active surface of the semiconductor chips, which are mated with a

plurality of second thermal fins formed on the heat conducting device.

24. The MCM package of claim 22, wherein the heat conducting device is a package lid, a package cap, a heat sink, a cooling plate, or a thermal hat.

25. The MCM package of claim 22, wherein heat conducting device is formed of copper.

26. A semiconductor package, comprising:

a semiconductor chip having a plurality of first thermal fins on a portion of a non-active surface of the semiconductor chip, wherein the first thermal fins longitudinally extend across the portion of the non-active surface of the semiconductor chip;

a heat conducting device having a plurality of second thermal fins on a portion of a mating surface of the heat conducting device, wherein the second thermal fins longitudinally extend across the portion of the mating surface of the heat conducting device; and

a thermal joint formed between the non-active surface of the semiconductor chip and the mating surface of the heat conducting device,

wherein the thermal joint comprises a band of interdigitated thermal fins comprising the first and second thermal fins mated together and thermally coupled using a rigid bonding material or a compliant thermally conductive material, and

wherein the thermal joint further comprises a complaint thermal conductive material formed between planar portions of the non-active surface of the semiconductor chip and the mating surface of the heat conducting device.

27. The semiconductor package of claim 26, wherein the heat conducting device is a package lid, a package cap, a heat sink, a cooling plate, or a thermal hat.

28. The semiconductor package of claim 27, wherein the heat conducting device is formed of copper.

29. The semiconductor package of claim 26, wherein the rigid bonding material comprises a thermally conductive solder or a filled polymer such as silver filled epoxy.

30. The semiconductor package of claim 26, wherein the compliant thermally conductive material between the interdigitated thermal fins and between the planar portions

of the non-active surface and mating surface are formed of the same material.

31. The semiconductor package of claim 26, wherein the compliant thermally conductive material between the interdigitated thermal fins and between the planar portions of the non-active surface and mating surface are formed of a different material.

32. The semiconductor package of claim 26, wherein the band of interdigitated thermal fins is orientated to extend in a direction that passes through a hot spot area of the semiconductor chip.

33. A semiconductor package, comprising:

a semiconductor chip having a mesa formed on a non-active surface of the semiconductor chip, wherein the mesa coincides with a hot spot region of the semiconductor chip,

a heat conducting device having a planar mating surface; and

a thermal joint formed between the non-active surface of the semiconductor chip and the planar mating surface of the heat conducting device,

wherein the thermal joint comprises a rigid bonding material formed between the mesa on the non-active surface of the semiconductor chip and the planar surface of the heat conducting device, and

wherein the thermal joint comprises a complaint thermal conductive material formed between planar portions of the non-active surface of the semiconductor chip and the planar mating surface of the heat conducting device.

34. The semiconductor package of claim 33, wherein the heat conducting device is a package lid, a package cap, a heat sink, a cooling plate, or a thermal hat.

35. The semiconductor package of claim 33, wherein the heat conducting device is formed of copper.

36. The semiconductor package of claim 33, wherein the rigid bonding material comprises a thermally conductive solder or filled polymer, such as silver filled epoxy.

37. A semiconductor package, comprising:

a semiconductor chip having one or more thermal fins bonded on a non-active surface of the semiconductor chip, wherein the one or more thermal fins are bonded on an area

of the non-active surface which coincides with a hot spot region of the semiconductor chip,

a heat conducting device having a planar mating surface with one or more recessed structures formed therein; and

a thermal joint formed between the non-active surface of the semiconductor chip and the planar mating surface of the heat conducting device,

wherein the thermal joint comprises the one or more thermal fins insertably engaged with the one or more recessed structures with a compliant thermal conductive material formed between the one or more thermal fins and recessed structures, and

wherein the thermal joint comprises a complaint thermal conductive material formed between planar portions of the non-active surface of the semiconductor chip and the planar mating surface of the heat conducting device.

38. The semiconductor package of claim 37, wherein the heat conducting device is a package lid, a package cap, a heat sink, a cooling plate, or a thermal hat.

39. The semiconductor package of claim 37, wherein the heat conducting device is formed of copper.

40. The semiconductor package of claim 37, wherein the thermal fins are formed of copper.